REMARKS/ARGUMENTS

Claims 1-6 and 8-17 are now pending. Claims 1-17 were rejected as unpatentable over Forte in view of Antoon, Jr.

Applicant appreciates the thorough examination reflected in the Office Actions issued thus far. However, Applicant respectfully traverses the rejections for the following reasons.

A. The Combined References Still Fail to Teach the Claimed Invention

In the Office Action of September 22, 2005, the silicone-coated microporous film of Antoon, Jr. is deemed to correspond to the claimed intermediate microporous layer, and it is asserted that a person of ordinary skill in the art would have been motivated to use Antoon, Jr.'s microporous film as the "B" layer of Forte's breathable film, "since silicone-coated microporous film is well known to be a water vapor permeable microporous film as taught by Antoon, Jr." The outer "C" layers of Forte's film are asserted to meet the outer layers formed from heat sealable composition as claimed. This basis of rejection is repeated in the final Office Action.

As noted in Section B below, Applicant submits that Forte and Antoon, Jr. would not have been combined as asserted in the Office Action. However, even if Forte and Antoon, Jr. were combined, they still would not teach the invention as claimed. In particular, the combination would not have the outer layers formed from heat sealable composition as claimed. Each of the independent claims has been amended to include the limitations of Claim 7 reciting that the heat-sealable composition of the outer layers comprises at least one of polyolefin, ethylene vinyl acetate, ethylene methyl acrylate, ethylene butyl acrylate, ethylene methyl acid and ionomer as a primary polymer. Since this limitation was already present in the claims, these amendments do not raise any new issue or require any new search, and hence the amendments should be entered and considered.

Forte does not teach or suggest outer layers formed of such heat-sealable polymers.

Forte teaches that the outer "monolithic" layers C of his film must be a *hydrophilic* polymeric resin (col. 6, lines 45-47). Specific examples of such resins are cited as *polyesters*, *polyamides*, and grades of *polyvinyl alcohol* and *ethyl vinyl alcohol* (col. 6, lines 55-59). Also cited are commercial products such as Pebax®, Hytrel®, and Eastman resins (col. 6, lines 60-67). The Pebax® resins are polyether block amides (PEBA)—see the MatWeb web site printouts enclosed herewith. It will be noted that the Pebax® resins generally have a relatively high water absorption (ASTM D570) of 1.2%, which is consistent with Forte's description of these resins as hydrophilic.

The Hytrel® resins are polyester elastomers—see the MatWeb printouts enclosed herewith. Water absorption data is given only for the G4778 grade, and is listed as 2.3%, which again is consistent with Forte's description of the Hytrel® resins as hydrophilic.

Although detailed information on the Eastman 14776 resin could not be obtained, this material is believed to be a copolyester (see U.S. Patent No. 6,730,057 at col. 12, lines 26-31).

Thus, the materials cited by Forte for his outer "C" layers are entirely different from the claimed polymers in the amended claims. Significantly, Forte's "C" layers are not used as "heat-sealable" layers, as persons of ordinary skill in the art would understand. The purpose of the "C" layers is to absorb moisture. Those skilled in the art would not choose PVA, EVOH, polyamide, or polyester as outer heat-sealable layers in a multilayer film, because these materials have relatively high melting temperatures. Outer heat-sealable layers in a multilayer film are generally desired to have low melting temperatures so that the heat-sealable layers can be melted without risk of melting the other layers of the film.

It should also be noted that the claimed materials for the outer heat-sealable layers in the present claims are not particularly hydrophilic. The Modern Plastics Encyclopedia (McGraw-Hill, 1992) gives the following data for water absorption and melting temperatures of various polymers (the page number being cited for each polymer):

Polymer	Melting Temperature, °C	Water Absorption, %
EVOH (p. 385)	142-191	6.7-8.6
polyamide (p. 391)	210-220	1.3-1.9
PET (p. 403)	245-265	0.1-0.2
ionomer (p. 387)	81-96	0.1-0.5
polyethylene (LDPE) (p. 408-409)	98-115	<0.01
EVA (p. 408-409)	103-108	0.005-0.13
EMA (p. 408-409)	83	0
HDPE (p. 408-409)	130-137	<0.01
polypropylene (p. 415)	160-175	0.01-0.03

Forte's hydrophilic polymers such as EVOH, polyester, and polyamide have high melting temperatures in comparison with true "heat-sealable" materials such as polyolefins (e.g., polyethylene), EVA, EMA, and ionomer, as recited in the present claims.

Thus, Forte's disclosure actually teaches away from a multilayer film as claimed, having heat-sealable outer layers comprising at least one of <u>polyolefin, ethylene vinyl acetate, ethylene methyl acrylate, ethylene butyl acrylate, ethylene methyl acid and ionomer as a primary polymer</u>. **Because these claimed polymers are not hydrophilic, Forte's disclosure teaches away from their use in Forte's film**.

Furthermore, with respect to Claim 10, the combination of Forte and Antoon, Jr., even if made, fails to disclose or suggest a multilayer film having first and second outer layers and a center layer each independently comprising a heat sealable composition comprising at least one

of polyolefin, ethylene vinyl acetate, ethylene methyl acrylate, ethylene butyl acrylate, ethylene methyl acid and ionomer as a primary polymer.

For at least the above reasons, it is respectfully submitted that the rejections of Claims 1-17 are erroneous and should be withdrawn.

B. Forte and Antoon, Jr. Would Not Have Been Combined

Forte specifically describes that the breathability he seeks for his film requires the ability to pass water vapor and oxygen at moderate to high transmission rates (col. 1, lines 16-20). A person of ordinary skill in the art considering Antoon, Jr.'s disclosure would have understood that the silicone-coated microporous film described as "substantially oxygen-impermeable" would be a poor choice for use in Forte's multilayer film where such breathability is a key objective (col. 3, lines 12-13). Antoon, Jr.'s silicone-coated microporous film does not fit this requirement because it is substantially oxygen-impermeable.

Therefore, there would not have been any motivation to use Antoon, Jr.'s silicone-coated microporous film as the "B" layer of Forte's multilayer breathable film, and indeed there would have been a strong disincentive to use it. Accordingly, the combination of Forte and Antoon, Jr. would not have been made.

For at least this additional reason, Applicant submits that the rejections of Claims 1-17 are erroneous and should be withdrawn.

Conclusion

Based on the above amendments and remarks, it is submitted that the rejections have been overcome and the application is in condition for allowance.

It is not believed that extensions of time or fees for net addition of claims are required, beyond those that may otherwise be provided for in documents accompanying this paper.

However, in the event that additional extensions of time are necessary to allow consideration of this paper, such extensions are hereby petitioned under 37 CFR § 1.136(a), and any fee required therefor (including fees for net addition of claims) is hereby authorized to be charged to Deposit Account No. 16-0605.

Respectfully submitted,

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Nancy McPartland

CLT01/4797404v1

Arkema Group Pebax® MX 1205 Polyether Block Amide (PEBA)

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Subcategory: Elastomer, TPE; Polyether Block Amide (PEBA); Polymer; Thermoplastic

Material Notes:
Typical application: Impact modifier

Information provided by Arkema Group

Physical Properties	Metric	English	Comments
Density	1.01 g/cc	0.0365 lb/in³	ASTM D792
Water Absorption	1.2 %	1.2 %	24 hr in water at 20°C; ASTM D570
Water Absorption at Saturation	0.4 %	0.4 %	20°C and 65% RH; ASTM D570
Melt Flow	9 g/10 min	9 g/10 min	ASTM D1238
Mechanical Properties			
Hardness, Shore D	42	42	ASTM D2240
Tensile Strength at Break	36 MPa	5220 psi	ASTM D638

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Elongation at Break	600 %	600 %	ASTM D638
Flexural Modulus	0.078 GPa	11.3 ksi	ASTM D790
Izod Impact, Notched	NB	NB	ASTM D256-A
Izod Impact, Unnotched	NB	NB	ASTM D256-A
Izod Impact, Notched @ -40°C	NB	NB	ASTM D256-A
Izod Impact, Unnotched @ -40°C	NB	NB	ASTM D256-A

Electrical Properties

Surface Resistance	3e+012 ohm	3e+012 ohm	20°C and 65% RH; ASTM D257

Thermal Properties

Heat of Fusion	22 J/g	9.46 BTU/lb	ASTM D3417
CTE, linear 20°C	200 µm/m-°C	111 µin/in-°F	-40°C to 140°C; ASTM D696
Melting Point	147 °C	297 °F	ASTM D3418
Deflection Temperature at 0.46 MPa (66 psi)	52 °C	126 °F	ASTM D648
Vicat Softening Point	114 °C	237 °F	under 1 daN; ASTM D1525

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Arkema Group Pebax® 4033 Polyether Block Amide (PEBA)

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Subcategory: Elastomer, TPE; Polyether Block Amide (PEBA); Polymer; Thermoplastic

Material Notes:
Typical application: Mechanical parts

Information provided by Arkema Group

Physical Properties	Metric	English	Comments
Density	1.01 g/cc	0.0365 lb/in³	ASTM D792
Water Absorption	1.2 %	1.2 %	24 hr in water at 20°C; ASTM D570
Water Absorption at Saturation	0.5 %	0.5 %	20°C and 65% RH; ASTM D570
Melt Flow	5 g/10 min	5 g/10 min	ASTM D1238
Mechanical Properties			
Hardness, Shore D	42	42	ASTM D2240
Tensile Strength at Break	36 MPa	5220 psi	ASTM D638

Elongation at Break	450 %	450 %	ASTM D638
Modulus of Elasticity	0.05 GPa	7.25 ksi	ASTM D638
Flexural Modulus	0.084 GPa	12.2 ksi	ASTM D790
Resilience	0.625	0.625	BS 903 par: A 8
Flex Crack Resistance	2	2	[mm] 20°C / 100000 flexures; ASTM D813
Flex Crack Resistance	4.5	4.5	[mm] -20°C / 50000 flexures; ASTM D813
Izod Impact, Notched	NB	NB	ASTM D256-A
Izod Impact, Unnotched	NB	NB	ASTM D256-A
Tear Strength	70 kN/m	399 pli	notched; ASTM D624 (C)
Tear Strength	95 kN/m	542 pli	unnotched; ASTM D624 (C)
Taber Abrasion, mg/1000 Cycles	70	70	ASTM D1242
Abrasion	80	80	mm^3; DIN 53516
Compression Set	21 %	21 %	Load = 9.3 MPa (22 hr / 70°C); ASTM D395 Method A
Izod Impact, Notched @ -40°C	NB	NB	ASTM D256-A
Izod Impact, Unnotched @ -40°C	NB	NB	ASTM D256-A

Electrical Properties

Surface Resistance	5e+012 ohm	5e+012 ohm	20°C and 65% RH; ASTM D257

Thermal Properties

Heat of Fusion	24 J/g	10.3 BTU/lb	ASTM D3417
CTE, linear 20°C	195 µm/m-°C	108 µin/in-°F	-40°C to 140°C; ASTM D696
Melting Point	160 °C	320 °F	ASTM D3418
Deflection Temperature at 0.46 MPa (66 psi)	52 °C	126 °F	ASTM D648
Vicat Softening Point	132 °C	270 °F	under 1 daN; ASTM D1525

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Arkema Group Pebax® 3533 Polyether Block Amide (PEBA)

Subcategory: Elastomer, TPE; Polyether Block Amide (PEBA); Polymer; Thermoplastic

Material Notes:

Information provided by Arkema Group

Physical Properties	Metric	English	Comments
Density	1.01 g/cc	0.0365 lb/in³	ASTM D792
Water Absorption	1.2 %	1.2 %	24 hr in water at 20°C; ASTM D570
Water Absorption at Saturation	0.5 %	0.5 %	20°C and 65% RH; ASTM D570
Melt Flow	8 g/10 min	8 g/10 min	ASTM D1238
Mechanical Properties			
Hardness, Shore A	83	83	ASTM D2240
Hardness, Shore D	33	33	ASTM D2240
Tensile Strength at Break	30 MPa	4350 psi	ASTM D638

Elongation at Break	670 %	670 %	ASTM D638
Modulus of Elasticity	0.0146 GPa	2.12 ksi	ASTM D638
Flexural Modulus	0.025 GPa	3.63 ksi	ASTM D790
Resilience	0.7	0.7	BS 903 par: A 8
Flex Crack Resistance	2	2	[mm] 20°C / 100000 flexures; ASTM D813
Flex Crack Resistance	2.5	2.5	[mm] -20°C / 50000 flexures; ASTM D813
Izod Impact, Notched	NB	NB	ASTM D256-A
Izod Impact, Unnotched	NB	NB	ASTM D256-A
Tear Strength	45 kN/m	257 pli	notched; ASTM D624 (C)
Tear Strength	71 kN/m	405 pli	unnotched; ASTM D624 (C)
Taber Abrasion, mg/1000 Cycles	81	81	ASTM D1242
Abrasion	96	96	mm^3; DIN 53516
Compression Set	54 %	54 %	Load = 9.3 MPa (22 hr / 70°C); ASTM D395 Method A
Izod Impact, Notched @ -40°C	NB	NB	ASTM D256-A
Izod Impact, Unnotched @ -40°C	NB	NB	ASTM D256-A

Electrical Properties

Surface Resistance	2e+012 ohm	2e+012 ohm	20°C and 65% RH; ASTM D257

Thermal Properties

Heat of Fusion	11 J/g	4.73 BTU/lb	ASTM D3417
CTE, linear 20°C	210 µm/m-°C	117 µin/in-°F	-40°C to 140°C; ASTM D696
Melting Point	143.5 °C	290 °F	ASTM D3418
Deflection Temperature at 0.46 MPa (66 psi)	46 °C	115 °F	ASTM D648
Vicat Softening Point	74 °C	165 °F	under 1 daN; ASTM D1525

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Arkema Pebax® MV 1041 SN 01 Polyether Block Amide (PEBA) (Dry)

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Subcategory: Elastomer, TPE; Polyether Block Amide (PEBA); Polymer; Thermoplastic

Close Analogs:
Arkema, formed in 2004, was formerly Atofina Chemicals and before that Elf Atochem.

Key Words: Thermoplastic Elastomer, TPE

Material Notes:
POLYETHER BLOCK AMIDE (PEBA) hardness 60 shore D breathable (high permeability to H2O vapor,CO2,O2) permanent antistatic grade
Applications: breathable films (medical, textile....)

ISO data provided by the manufacturer, Arkema.

No vendors are listed for this material. Please **click here** if you are a supplier and would like information on how to add your listing to this material.

Physical Properties	Metric	English	Comments
Density	1.04 g/cc	0.0376 lb/in³	
Water Absorption	12 %	12 %	

Moisture Absorption at Equilibrium	1 %	1 %	Humidity Absorption
Melt Flow	7.3 g/10 min	7.3 g/10 min	235°C/1 kg load

Mechanical Properties

Hardness, Shore D	60	60	
Tensile Strength, Yield	17 MPa	2470 psi	50 mm/min
Elongation at Break	Min 50 %	Min 50 %	Nominal Strain; 50 mm/min
Elongation at Yield	26 %	26 %	50 mm/min
Tensile Modulus	0.253 GPa	36.7 ksi	1 mm/min
Charpy Impact, Unnotched	NB	NB	
Charpy Impact, Notched Low Temp	1.14 J/cm²	5.43 ft-lb/in²	at -30°C
Charpy Impact, Unnotched Low Temp	NB	NB	
Charpy Impact, Notched	NB	NB	

Electrical Properties

Electrical Resistivity	5.52e+012 ohm-cm	5.52e+012 ohm-cm	
Surface Resistance	5.96e+012 ohm	5.96e+012 ohm	
Dielectric Strength	43.5 kV/mm	1100 kV/in	
Dissipation Factor	0.00048	0.00048	1 MHz
Dissipation Factor, Low Frequency	0.00127	0.00127	100 Hz

Thermal Properties

Melting Point	170 °C	338 °F	10°C/min
Oxygen Index	22.9 %	22.9 %	

Optical Properties

Transmission, Visible	80 %	80 %	Mfr. reports 'Transparent' but doesn't quantify.

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DuPont Hytrel® HTR8206 Polyester Elastomer

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Subcategory: Elastomer, TPE; Polyester, TP; Polymer; Thermoplastic

Close Analogs: Data provided by the manufacturer.

Material Notes:
Very high moisture vapor transmission rate for breathable film applications.

Physical Properties	Metric	English	Comments
Density	1.19 g/cc	0.043 lb/in³	ASTM D792
Melt Flow	12 g/10 min	12 g/10 min	230°C/2.16 kg
Mechanical Properties			
Hardness, Shore D	45	45	ASTM D676
Tensile Strength, Ultimate	19.2 MPa	2780 psi	ASTM D638
Tensile Strength, Yield	5.1 MPa	740 psi	ASTM D638

Elongation at Break	510 %	510 %	ASTM D638
Flexural Modulus	0.08 GPa	11.6 ksi	ASTM D790
Izod Impact, Notched	NB	NB	ASTM D256
Izod Impact, Notched Low Temp	1.8 J/cm	3.37 ft-lb/in	at -40°C; ASTM D256 Method A
Tear Strength	86 kN/m	491 pli	Initial Tear Resistance, ASTM D1004
Taber Abrasion, mg/1000 Cycles	0	0	CS-17 Wheel, 1000g; ASTM D1044 (modified)

Thermal Properties

Melting Point	200 °C	392 °F	ASTM D3418
Maximum Service Temperature, Air	38 °C	100 °F	Deflection temperature at 1.8 MPa
Deflection Temperature at 0.46 MPa (66 psi)	62 °C	144 °F	ASTM D648
Deflection Temperature at 1.8 MPa (264 psi)	38 °C	100 °F	ASTM D648
Vicat Softening Point	151 °C	304 °F	Rate B; ASTM D1525

Processing Properties

Processing Temperature	165 - 260 °C	329 - 500 °F	

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DuPont Hytrel® HTR8171 Polyester Elastomer

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Subcategory: Elastomer, TPE; Polyester, TP; Polymer; Thermoplastic

Close Analogs: Data provided by the manufacturer.

Material Notes:
Very high moisture vapor transmission rate for breathable film applications.

Physical Properties	Metric	English	Comments
Density	1.17 g/cc	0.0423 lb/in³	ASTM D792
Melt Flow	9 g/10 min	9 g/10 min	190°C/2.16 kg
Mechanical Properties			
Hardness, Shore D	32	32	ASTM D676
Tensile Strength, Ultimate	10.2 MPa	1480 psi	ASTM D638
Tensile Strength, Yield	2.8 MPa	406 psi	ASTM D638

Elongation at Break	210 %	210 %	ASTM D638
Flexural Modulus	0.0248 GPa	3.6 ksi	ASTM D790
Izod Impact, Notched	NB	NB	ASTM D256
Izod Impact, Notched Low Temp	NB	NB	at -40°C; ASTM D256 Method A
Tear Strength	45 kN/m	257 pli	Initial Tear Resistance, ASTM D1004
Taber Abrasion, mg/1000 Cycles	85	85	CS-17 Wheel, 1000g; ASTM D1044 (modified)

Thermal Properties

Melting Point	150 °C	302 °F	ASTM D3418
Maximum Service Temperature, Air	42 °C	108 °F	Deflection temperature at 0.46 MPa
Deflection Temperature at 0.46 MPa (66 psi)	42 °C	108 °F	ASTM D648
Vicat Softening Point	76 °C	169 °F	Rate B; ASTM D1525

Processing Properties

Processing Temperature	165 - 260 °C	329 - 500 °F	

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DuPont Hytrel® G4778 Polyester Elastomer

Subcategory: Elastomer, TPE; Polyester, TP; Polymer; Thermoplastic

Close Analogs: Data provided by the manufacturer.

Material Notes:
Good balance of low and high temperature properties.

Physical Properties	Metric	English	Comments
Density	1.2 g/cc	0.0434 lb/in³	ASTM D792
Water Absorption	2.3 %	2.3 %	24 hr. ASTM D570
Melt Flow	13 g/10 min	13 g/10 min	230°C/2.16 kg
Mechanical Properties			
Hardness, Shore D	47	47	ASTM D676
Tensile Strength, Ultimate	20.7 MPa	3000 psi	ASTM D638

Tensile Strength, Yield	7 MPa	1020 psi	ASTM D638
Elongation at Break	300 %	300 %	ASTM D638
Flexural Modulus	0.117 GPa	17 ksi	ASTM D790
Izod Impact, Notched	NB	NB	ASTM D256
Izod Impact, Notched Low Temp	1.65 J/cm	3.09 ft-lb/in	at -40°C; ASTM D256 Method A
Tear Strength	91 kN/m	519 pli	Initial Tear Resistance, ASTM D1004
Taber Abrasion, mg/1000 Cycles	12	12	CS-17 Wheel, 1000g; ASTM D1044 (modified)

Thermal Properties

Melting Point	208 °C	406 °F	ASTM D3418
Maximum Service Temperature, Air	46 °C	115 °F	Deflection temperature at 1.8 MPa
Deflection Temperature at 0.46 MPa (66 psi)	80 °C	176 °F	ASTM D648
Deflection Temperature at 1.8 MPa (264 psi)	46 °C	115 °F	ASTM D648
Vicat Softening Point	175 °C	347 °F	Rate B; ASTM D1525

Processing Properties

Processing Temperature	165 - 260 °C	329 - 500 °F

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